

THE ELAEAGNACEAE IN THE SOUTHEASTERN UNITED STATES¹

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ELAEAGNACEAE A. L. de Jussieu, Gen. Pl. 74. 1789, "Elaeagni." nom. cons.

(OLEASTER FAMILY)

The family is easily recognized and homogeneous, consisting of three genera, *Hippophaë* L., *Shepherdia* Nutt., and *Elaeagnus* L., all characterized by a dense covering of silvery or rusty, peltate or stellate hairs on the flowers, twigs, and leaves; 2–4-merous flowers lacking petals; and a fleshy or mealy berry- or drupelike accessory fruit derived from the accrescent floral tube. Only *Elaeagnus* is represented in our area. Nelson and Fosberg considered the family to be unigeneric, recognizing only *Elaeagnus*.

The genus *Hippophaë*, sea-buckthorn, of Europe and Asia, is distinguished by alternate leaves, unisexual flowers with a two-lobed floral tube, four stamens, poorly developed nectaries, and a long stigma. Generally, only *H. rhamnoides* L., composed of three subspecies, is recognized. In subsp. *rhamnoides* two races have been described, the one diploid ($2n = 12$), the other tetraploid ($2n = 24$). A count of $2n = 20$ has also been reported for the species. The orange flesh of the "fruit" is reported rich in vitamin C. Vegetative multiplication is common by means of underground stems.

The buffalo-berries, *Shepherdia*, comprising three North American species, have opposite leaves, unisexual flowers, a four-lobed floral tube, eight stamens, a ring of eight nectariferous glands in the floral tube at the base of the calyx lobes, and a short stigma. Chromosome numbers are known for *S. canadensis* Nutt., $2n = 22$, and for *S. argentea* Nutt., $2n = 26$.

On the basis of anatomy, *Hippophaë* and *Shepherdia* are considered by Servettaz to be more closely related to each other than to *Elaeagnus*. The family is most commonly placed in the Myrtales next to the Thymelaeaceae. It also shares several characters with the Proteaceae and Penaeaceae. Hutchinson alone closely relates the Elaeagnaceae to the Rhamnaceae.

¹ Prepared for a generic flora of the southeastern United States, a joint project of the Arnold Arboretum and Gray Herbarium made possible through the support of George R. Cooley and the National Science Foundation and under the direction of Carroll E. Wood, Jr., and Reed C. Rollins. The scheme follows that outlined at the beginning of the series (Jour. Arnold Arb. 39: 296–346. 1958). The area covered in this, as in former treatments, is bounded by and includes North Carolina, Tennessee, Arkansas, and Louisiana. Material included in the descriptions in brackets applies to species outside this area, and references marked by an asterisk have not been verified by the author.

Clusters of root nodules are commonly formed in all three genera through infection of developing lateral roots by an unidentified endophyte. The causal organisms have been variously interpreted as filamentous fungi, nitrogen-fixing bacteria, actinomycetes, and myxomycetes, but their identity is still unknown due to difficulties in isolating and culturing them. The endophyte is soil borne and must be reintroduced into the plants of each new generation. It is apparently capable of fixing nitrogen and in this way maintains a symbiotic relationship with its host, much as do bacteria associated with legumes. The only other nonleguminous angiosperm genera known to bear root nodules are *Coriaria*, *Myrica*, *Alnus*, *Casuarina*, *Ceanothus*, and *Discaria*; in none of these has the endophyte been positively identified.

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1. ***Elaeagnus*** Linnaeus, Sp. Pl. 1: 121. 1753; Gen. Pl. ed. 5. 57. 1754.

Shrubs or rarely trees, with alternate, unarmed or spiny branches, densely covered with silvery or brownish stellate or peltate hairs (scales). Leaves alternate, deciduous or persistent, petiolate, lanceolate to oblong or ovate, simple, entire, exstipulate, both sides or only the lower (abaxial) side covered with peltate hairs. Flowers regular, bisexual or unisexual (the plants then polygamo-dioecious), pedicellate, solitary or clustered in the axils of leaves or deciduous bracts, 4-merous. Floral tube cylindrical to globose at base, slightly contracted at apex of the ovary, then flaring and cylindric to campanulate above, the portion surrounding the ovary persistent, accrescent, the portion above deciduous in fruit; calyx lobes 4, silvery or rusty on the outer surface, yellow within; nectariferous disc cone- or cup-shaped, surrounding the base or diffuse at the base of the style. Petals none. Stamens 4, at the base of and alternating with the calyx lobes; filaments very short; anthers versatile, introrse, 2-locular, dehiscent longitudinally. Gynoecium 1-carpellate, superior, but often appearing inferior by contraction of the floral tube at the base of the style, free in the tube; stigma unilateral; style linear, canaliculate; ovary 1-locular, 1-ovulate, with basal placentation; ovule anatropous, 2-integumented. Fruit berry- or drupelike, the outer layers of the persistent floral tube fleshy or mealy, the inner layer hard and strongly 8-striate or leathery to membranaceous with very weak striations, ellipsoid, with or without hairs on the inner surface, surrounding a membranaceous achene. Seed 1, with little or no endosperm; embryo large, straight, the cotyledons fleshy. Embryo sac development of the normal (*Polygonum*) type. LECTOTYPE SPECIES: *E. angustifolius* L.; see Britton & Brown, Illus. Fl. No. U.S. ed. 2. 2: 575. 1913. (Name from Greek, *elaia*, olive, and *agnos*, the classical name for the chaste-tree, *Vitex agnus-castus*.²) — OLEASTER, RUSSIAN OLIVE, SILVERBERRY.

² The Greek feminine word *agnos* was adopted by Linnaeus and the ending altered to the Latin masculine *-us*. The gender of *Elaeagnus* is, therefore, masculine and not feminine as regarded in most taxonomic literature. (See Art. 73, sect. 2(2), Int. Code Bot. Nomencl. 1961.)—The Latin word *agnus*, lamb, should not be confused with the altered Greek word. According to Linnaeus (*Critica Botanica*, pp. 127, 128. 1737; transl. by A. Hort, 1938, pp. 100, 101), "He [Gaza] translated Greek names into Latin according to the meaning. For example, *Vitex* was called in Greek *Agnos*,

A taxonomically difficult genus of about 40 species, including many subspecies and varieties, placed by Servettaz in sect. ELAEAGNUS (§ *Deciduae* Serv.), defined as spring-flowering with deciduous leaves, and sect. SEMPERVIRENTES Serv., comprising fall-flowering species having evergreen leaves. The genus is best represented in the steppe regions of Asia and in southern Europe; *E. commutatus* Bernh. (*E. argenteus* Pursh, not Moench), $2n = 28$, is native to Canada and the northern United States. Three Asiatic species cultivated in the southeastern United States have become naturalized to varying degrees in scattered localities. *Elaeagnus pungens* Thunb. (sect. SEMPERVIRENTES), $2n = 28$, is established in North and South Carolina and Tennessee. *Elaeagnus umbellatus* Thunb., $2n = 28$, (flowers in axillary umbel-like clusters) and *E. multiflorus* Thunb. (flowers solitary or paired in the axils), both of sect. ELAEAGNUS, occur in isolated populations as escapes.

Definition is difficult in many of the European and Asiatic species because of the morphological variability displayed over the extensive and ecologically diverse parts of their ranges. The presence of juvenile and adult leaves and the change in form of the fruit with maturation add to the difficulty. Development of spiny branches is most pronounced under dry, poor soil conditions and in young plants.

Several species are cultivated for their handsome silvery foliage and decorative red or silvery fruits; the Russian olive, *Elaeagnus angustifolius*, $2n = 12, 28$, is one of the most widely planted. Forms with variegated leaves are available in a few cultivated species.

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that word in Greek signifying *castus*; hence Gaza called *Vitex* 'Castus' instead of 'Agnus.'

"The barbarians who followed him supposed *agnus* to be actually a Latin word, a synonym for 'sheep': hence they took *agnus* as a substantive and *castus* as an adjective, as *ovis casta* or *agnus castus*; and this nomenclature specially pleased the Pharmacists, though none more barbarous could have been found. From *Agnus* also is formed *Elaeagnus*, as it were *Olea-Vitex*: hence the right spelling is *Elaeagnus*, not *Elaechnus*."

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